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ABSTRACT

Data are presented describing expenditures for personal health services in Michigan from 1977 to 1981. The rapid growth in expenditures is illustrated, as well as the rates of growth in expenditures, for major categories of health services. Personal health expenditures are defined as payments for care directly provided to patients: specifically, hospital and nursing home services, physician and dental services, services provided by other professionals, drugs, eyeglasses and appliances, and other patient-care services. These expenditures are further defined by their being paid for by private health insurance programs, Medicare and Medicaid, and individual spending. Excluded from this report are expenditures for public and environmental health services, administration of health insurance programs, and health-related research and educational activities. Appendices include: (1) methodology for estimating personal health expenditures; (2) definition and methodology used by health care financing administration to estimate state personal health expenditures; and (3) demographic and economic adjustments. (JD)

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MICHIGAN

HEALTH CARE COSTS REVIEW

Personal Health Care Expenditures, 1966-1981

Number 1
February 1983

OFFICE OF HEALTH AND MEDICAL AFFAIRS
DEPARTMENT OF MANAGEMENT AND BUDGET

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Health Care Costs Review, initiated with this issue, is a periodic publication of the Office of Health and Medical Affairs to be devoted to presenting important data and information related to health care costs in Michigan. This first issue provides data on personal health care expenditures in Michigan. Prior to this publication, no comprehensive up-to-date source of data on overall health care costs has been available for Michigan. It is our plan to update this health expenditure data at least once each year to provide a definitive and ongoing source of information on health care costs.

Subsequent issues in the series may deal with particular aspects of the health care cost problem. The intended function of the series is to present data and the results of research related to health care costs, financing, and reimbursement. Although the papers themselves will not focus primarily on policy implications of the data, it is hoped that the information presented in this series will be used by those who are responsible for formulating and implementing health policy.

Jay G. Endsley, Director
Office of Health and Medical Affairs
Department of Management and Budget
State of Michigan

M I C H I G A N
H E A L T H C A R E
C O S T S R E V I E W

Personal Health Expenditures,
1966 - 1981

Number 1
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OFFICE OF HEALTH
AND MEDICAL AFFAIRS

Department of Management
and Budget

State of Michigan

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PERSONAL HEALTH EXPENDITURES IN MICHIGAN, 1966 - 1981

Introduction

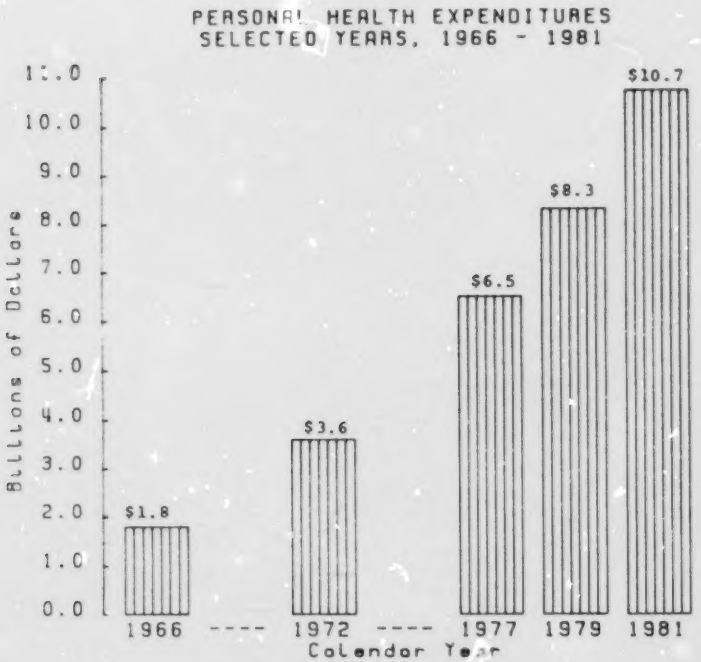
This paper and the accompanying tables present data which describe expenditures for personal health services in Michigan over the period from 1966 to 1981. These data also illustrate the rapid rate of growth in expenditures, as well as the rates of growth in expenditures for major categories of health services.

Personal health expenditures are payments for care directly provided to patients--specifically, payments for hospital and nursing home services, physician services, dental services, services provided by other health professionals, drugs, eyeglasses and appliances, and other patient-care services. Personal health expenditures exclude spending for public and environmental health services, administration of health insurance programs, health-related research, construction, and health-related educational activities. As a general rule, personal health services are those paid for by private health insurance programs, public programs such as Medicare and Medicaid, and individual out-of-pocket spending. The definitions of services used in this report are identical to those used by the Health Care Financing Administration, which annually publishes the definitive account of health care expenditures for the U.S. Readers desiring more detailed definitions are referred to Appendix B.

Total Expenditures

Michigan personal health expenditures have grown from $1.807 billion in 1966 to $10.724 billion in 1981. In other words, Michigan citizens in 1981 spent nearly six times as much as they did in 1966. The average annual rate of growth was 12.6 percent. Figure 1 illustrates these increases in expenditures.

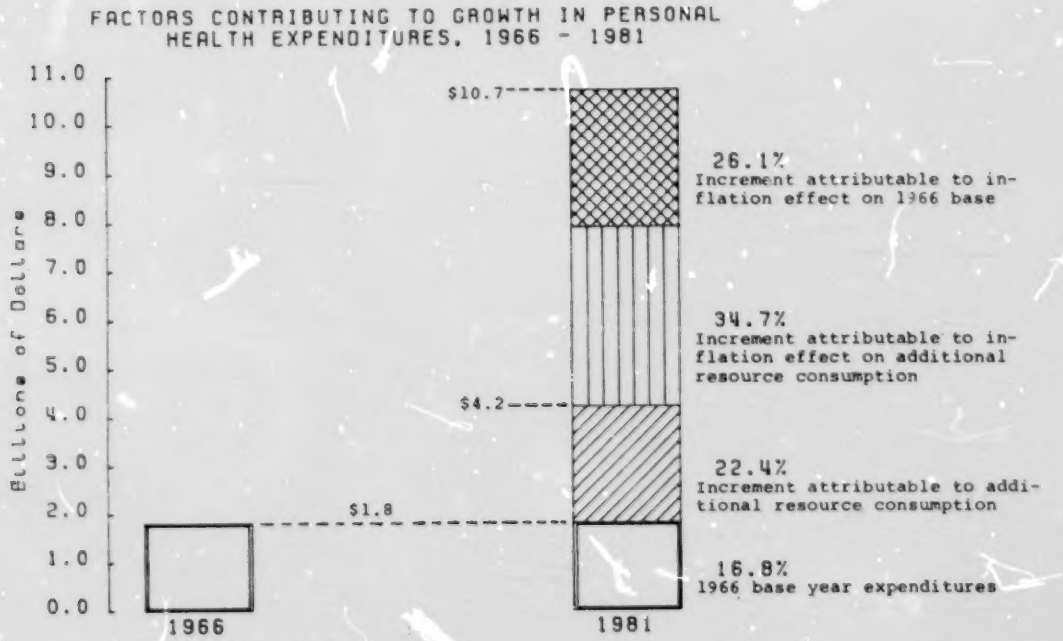
FIGURE 1



Not all of the increase in health expenditures represented an increase in real resources allocated to health services. A significant portion was the result of the general price inflation that was experienced by the entire economy. As illustrated in Figure 2, 26.1 percent of health expenditures in 1981 were attributable to the price inflation which occurred since 1966. This represents the

amount of inflation associated with the level of resource consumption in the 1966 base year. Another 22.4 percent of health expenditures in 1981 was attributable to real increases in the level of resource consumption between 1966 and 1981. This portion of the increase is illustrated by the diagonally shaded section of Figure 2. An additional 34.7 percent of health expenditures in 1981 was a joint effect of increased resource consumption and increased prices. This portion, which is illustrated by the vertically shaded section of Figure 2, reflects the fact that the new resources are purchased at 1981 prices, not 1966 prices.

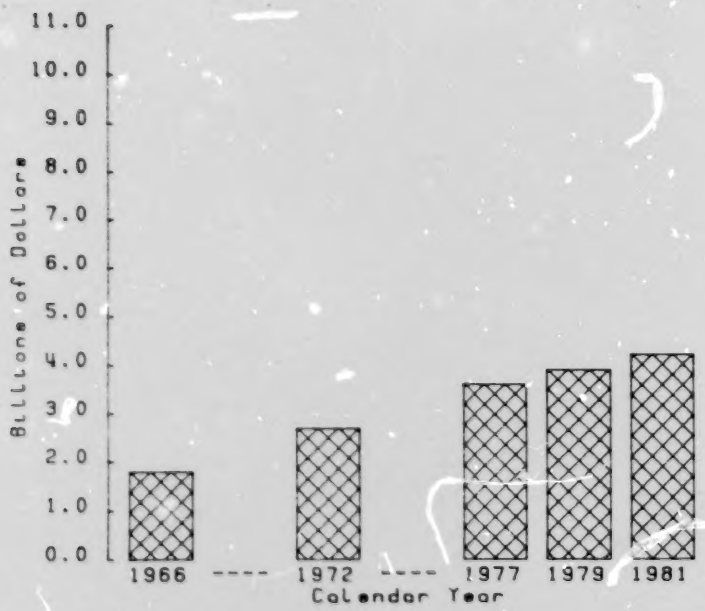
FIGURE 2



The growth in expenditures after adjusting for the effects of general price inflation is shown in Figure 3, which presents the data in constant value (1966) dollars. It is clear that growth, even after eliminating the effects of general inflation, has been rapid and continuous. The level increased by 2.3 times from 1966 to 1981, which represents an annual average growth rate of 5.8 percent. (It is important to note that the increase shown here is not entirely real growth in resource consumption. A portion represents the increase in medical care prices in excess of general price inflation. Since no measure of medical care price inflation is available for the state of Michigan as a whole, no attempt was made to separate out this effect.)

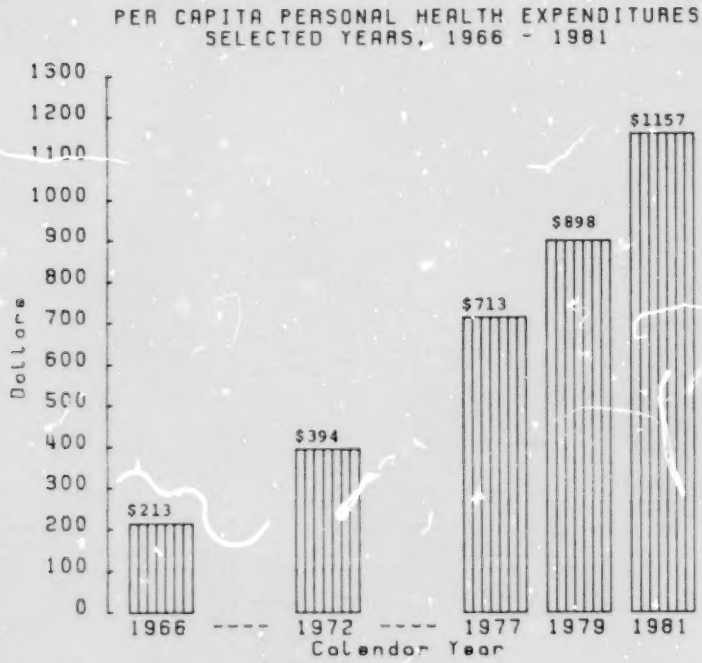
FIGURE 3

PERSONAL HEALTH EXPENDITURES, ADJUSTED FOR INFLATION (in billions of 1966 dollars)



The significance of these increases in total expenditures is perhaps better illustrated by measuring the growth of per capita expenditures--that is, the average amount spent for each resident of Michigan. Per capita figures give a better indication of growth rates because they control for expenditure increases that are simply the result of growth in the state's population. By this measure, personal health spending in 1981 was 5.4 times the 1966 level--up from $213 in 1966 to $1157 in 1981. (See Figure 4.)

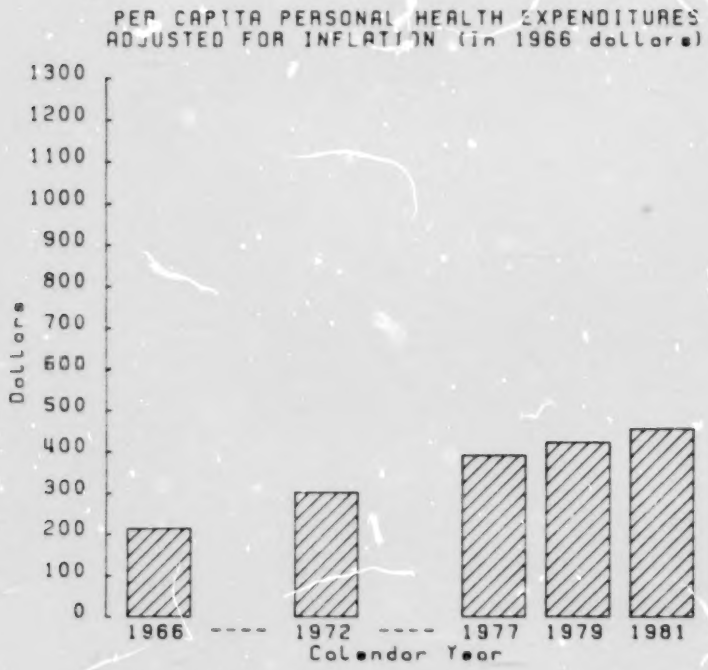
FIGURE 4



Again, a large portion of the increase reflected economy-wide inflation. Even after adjusting to eliminate the effects of general inflation, however, the data show that the average Michigan citizen in 1981 spent 2.1 times as much on health services as he or she did in 1966. These changes are depicted in Figure 5, which depict per capita

spending adjusted for inflation in terms of constant (1966) dollars.

FIGURE 5

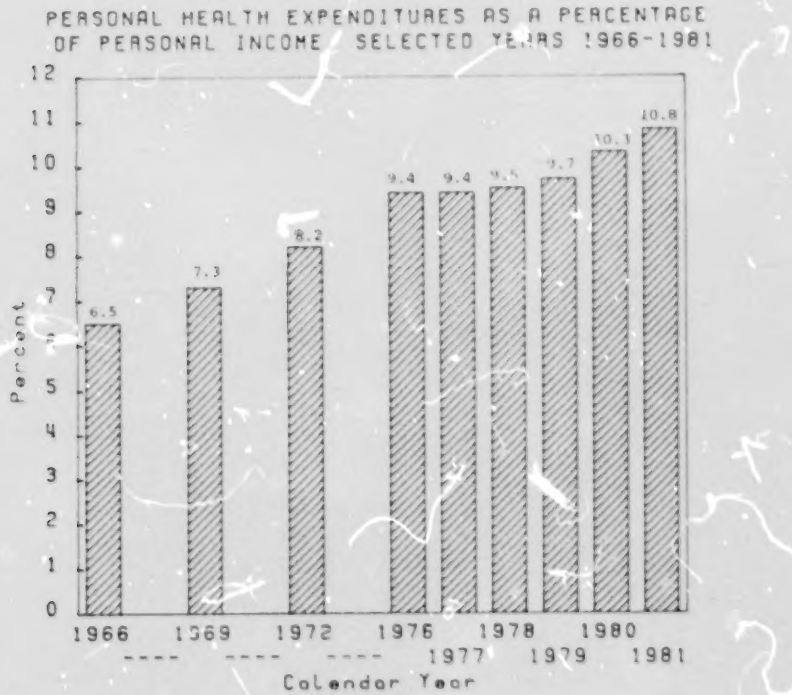


In the last decade or so, the rise in health costs described above has increasingly been recognized in both the public and private sectors as a major problem. This concern is related to the fact that the rapid rate of growth in health expenditures has required a substantial alteration in the way in which individuals, families, and businesses allocate their budgets. A consistently larger proportion of resources has been devoted to health care over the years, paid for in the form of higher health insurance premiums and higher taxes. This, of course, leaves a smaller proportion for all other purposes.

One way of measuring the impact of rising personal health expenditures is to compare the growth of health

expenditures with the growth of personal income, since income is the measure of the capacity to purchase all goods and services. From 1966 to 1981 Michigan per capita personal income rose at an annual average rate of 8.2 percent, before adjusting for inflation. During the same period, the average annual rate of growth of per capita personal health expenditures in the state was 11.9 percent. This disparity in growth rates is the explanation for the increase in the proportion of personal income allocated to health care, which rose from 6.5 percent in 1966 to 10.8 percent in 1981, as shown in Table 6 below. If that rate of growth were to continue for the next 15 years, by 1996 the residents of the state would be devoting 18 percent of personal income to personal health care.

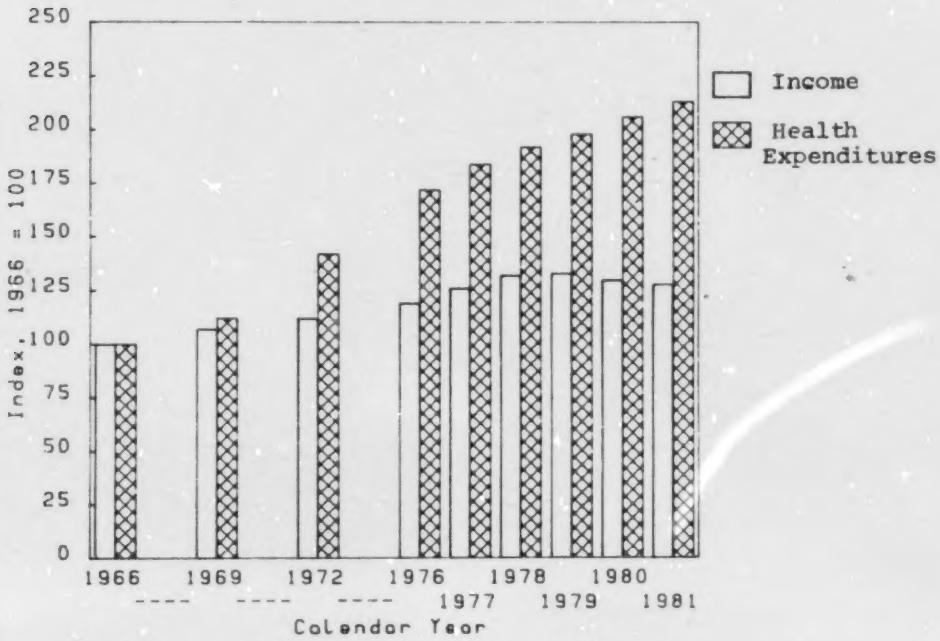
FIGURE 6



The relationship between growth in health expenditures and growth in personal income is illustrated graphically in Figure 7 below, which compares the growth of per capita income with the growth of per capita health expenditures, both adjusted for the effects of inflation. As Figure 7 shows, the rate of growth in per capita health expenditures has exceeded the rate of growth in per capita personal income by a large margin. Adjusted for inflation, per capita income increased by 28.3 percent, whereas per capita health expenditures increased by 113.5 percent between 1966 and 1981. The real meaning of such increases in the proportion of income spent for health is that less income is available for individuals and families to use for other purposes, such as food, housing, educational services, savings, etc.

FIGURE 7

Index of Per Capita Health Expenditures and Per Capita Income, Adjusted for Inflation, 1966-1981



Expenditures by Type of Service

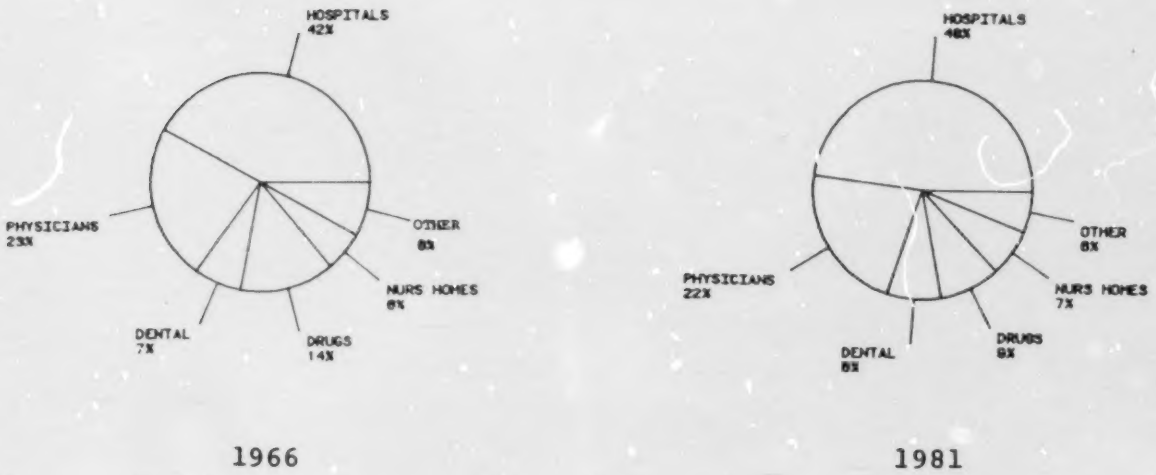
Michigan personal health spending purchases a wide variety of goods and services. However, over two-thirds of this spending goes for hospital and physician services. In 1981, for example, 48 percent or $5.106 billion was spent for hospital care and 22 percent or $2.389 billion was spent for physician services. Figures 8 and 9 illustrate the distribution of expenditures by type. As Figure 8 shows, during the period from 1966 to 1981, the proportion of the personal health care dollar going to hospitals has increased by 14 percent, up from 42 percent to 48 percent of the total. The proportion spent on nursing homes has also increased, whereas spending for drugs has fallen by approximately 40 percent.

Hospital Services. Figure 9 shows the distribution of services for selected years between 1966 and 1981. The largest single category of personal health expenditures is hospital services. In 1981, Michigan residents spent $5.106 billion for hospital services, or $551 per capita. Since 1966, hospital costs have grown faster than any other category of expenditures; in fact, the 1981 level is 6.7 times the 1966 level. This represented an average annual rate of growth of 13.6 percent. Even after adjusting for the effects of general price inflation, 1981 expenditures were 2.6 times the 1966 figure.

Physician Services. Physician services are the second largest category of expenditure. In 1981, $2.389 billion was spent for physician services, or $258 per capita. Expenditures for physician services have, like other categories of expenditures, grown quite rapidly. Between 1976 and 1981, growth in this category has virtually equalled the rate of growth for hospital expenditures,

FIGURE 8

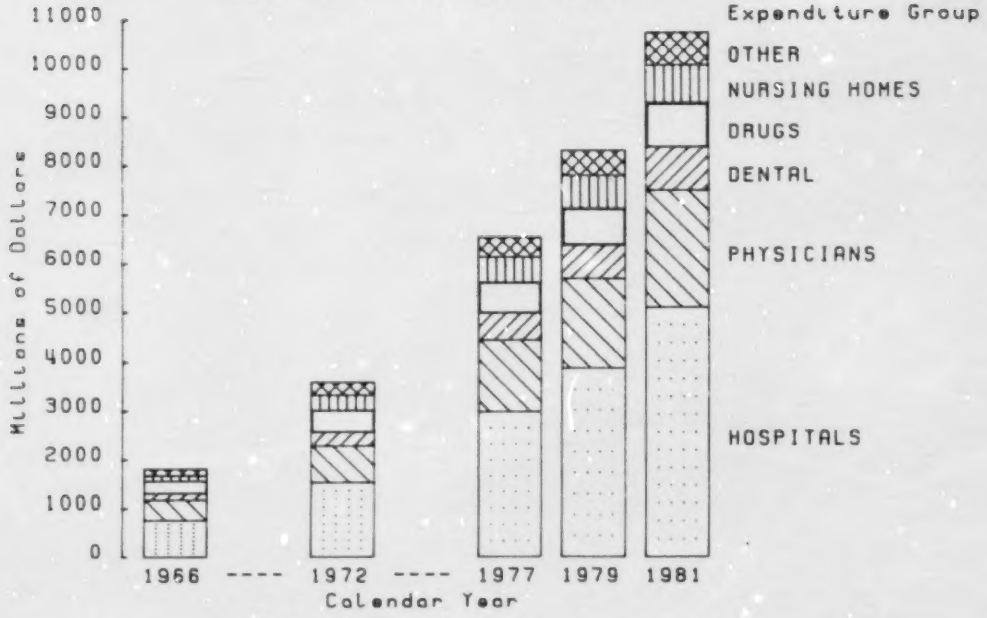
DISTRIBUTION OF PERSONAL HEALTH
EXPENDITURES, BY SERVICE



1966 1981

FIGURE 9

MICHIGAN PERSONAL HEALTH CARE EXPENDITURES
SELECTED YEARS, 1966 - 1981



averaging 12.4 percent per year, and was exceeded only by the rate of growth in spending for professional services other than medical and dental.

Other Goods and Services. Growth in spending in categories other than hospital and physician services has varied widely. Spending for drugs, eyeglasses, and appliances has grown relatively slowly; since 1976, in fact, spending in these categories has remained almost constant in inflation-adjusted terms. On the other hand, spending for professional services other than medical and dental has risen extremely rapidly particularly since 1976. Spending for dental services, nursing home care, and all other services has risen at varying rates. For example, spending for dental services rose dramatically until about 1980 but appears to have moderated somewhat since then.

* * * * * * *

Detailed data regarding changes in all categories of health expenditures, comparisons of per capita Michigan and U.S. expenditures, and relationships between growth of Michigan personal income and personal health expenditures are presented in the tables which follow.

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Table 1

SUMMARY TABLE: PERSONAL HEALTH EXPENDITURES, PERSONAL INCOME, POPULATION, AND GNP DEFLATOR, SELECTED YEARS, 1966-1981

	1966	1969	1972	1976	1977	1978	1979	1980	1981
Personal Health Expenditures, Michigan (billions of dollars)	1.807	2.534	3.555	5.740	6.530	7.376	8.306	9.449	10.724
As Percentage of Personal Income	6.5	7.3	8.2	9.4	9.4	9.5	9.7	10.3	10.8
Per Capita Personal Health Expenditures, Michigan (dollars)	213	289	394	630	713	802	898	1020	1157
Per Capita Personal Health Expenditures, U. S. (dollars)	203	283	380	601	672	745	841	965	1112
Percentage Change from Previous Period:									
Personal Health Expenditures, Michigan	--	--	--	--	13.8	13.0	12.6	13.8	13.5
Personal Health Expenditures, Adjusted for Inflation, Michigan	--	--	--	--	7.5	5.2	3.7	4.1	3.7
Per Capita Personal Health Expenditures, Michigan	--	--	--	--	13.3	12.4	12.0	13.6	13.4
Per Capita Personal Health Expenditures, Adjusted for Inflation, Michigan	--	--	--	--	7.0	4.7	3.1	3.9	3.6
Personal Income	--	--	--	--	13.0	12.2	10.5	6.6	8.4
Per Capita Personal Income, Michigan	--	--	--	--	12.5	11.7	10.0	6.5	8.2
Per Capita Personal Income, Adjusted for Inflation, Michigan	--	--	--	--	6.3	4.0	1.2	-2.6	-1.1
Population, Michigan	--	--	--	--	0.4	0.5	0.5	0.1	0.1
GNP Deflator	--	--	--	--	5.8	7.4	8.6	9.3	9.4
Addenda:									
Personal Income, Michigan (billions of dollars)	27.844	34.862	43.282	61.324	69.290	77.776	85.981	91.650	99.314
Population, Michigan (millions)	8.492	8.765	9.025	9.117	9.157	9.202	9.249	9.262	9.270
GNP Deflator									
1972 = 100	76.8	86.7	100.0	132.3	140.0	150.4	163.4	178.6	195.5
1981 = 100	39.3	44.4	51.1	67.7	71.6	76.9	83.6	91.4	100.0

Table 2

EXPENDITURES FOR PERSONAL HEALTH CARE IN MICHIGAN
(in millions of dollars)

YEAR	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	YEAR
1966	1807	757	412	132	41	257	49	108	51	1966
...										...
1969	2534	1072	569	193	49	340	64	184	64	1969
...										...
1972	3555	1517	768	276	59	447	93	312	85	1972
...										...
1976	5740	2430	1216	494	90	587	136	445	131	1976
1977	6530	2972	1464	550	116	624	144	519	140	1977
1978	7376	3383	1661	615	134	679	160	587	157	1978
1979	8306	3866	1817	698	161	746	175	668	176	1979
1980	9449	4411	2104	811	176	836	193	716	204	1980
1981	10724	5106	2389	876	212	917	212	770	242	1981

Table 3

PERCENT CHANGE IN PERSONAL HEALTH CARE EXPENDITURES IN MICHIGAN

INTERVAL	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	INTERVAL
1976-77	13.8	12.6	20.4	11.4	29.2	6.4	5.4	16.5	6.7	1976-77
1977-78	13.0	13.8	13.5	11.7	15.1	8.8	11.5	13.2	12.1	1977-78
1978-79	12.6	14.3	9.4	13.5	20.4	9.8	8.9	13.7	12.2	1978-79
1979-80	13.8	14.1	15.8	16.1	9.0	12.1	10.3	7.2	15.8	1979-80
1980-81	13.5	15.8	13.6	8.0	20.7	9.7	10.1	7.5	18.9	1980-81
1966-81	493.6	574.5	480.4	561.8	422.9	257.1	331.6	613.2	371.9	1966-81
1976-81	86.8	93.4	96.4	77.2	135.6	56.4	55.5	72.8	84.7	1976-81

Table 4

EXPENDITURES FOR PERSONAL HEALTH CARE IN MICHIGAN -- ADJUSTED FOR INFLATION
(in millions of 1981 dollars)

YEAR	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	YEAR
1966	4602	1928	1048	337	103	654	125	275	131	1966.
...										...
1969	5714	2416	1282	435	109	767	145	475	144	1969.
...										...
1972	6951	2966	1501	539	114	874	152	609	166	1972.
...										...
1976	8480	3901	1797	730	133	867	201	658	194	1976.
1977	9116	4149	2044	768	162	872	201	724	195	1977.
1978	9587	4397	2159	799	174	883	208	763	204	1978.
1979	9938	4625	2174	835	193	892	209	799	210	1979.
1980	10342	4827	2302	887	193	915	211	784	223	1980.
1981	10724	5106	2389	876	212	917	212	770	242	1981.

17

Table 5

PERCENT CHANGE IN PERSONAL HEALTH CARE EXPENDITURES IN MICHIGAN -- ADJUSTED FOR INFLATION

INTERVAL	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	INTERVAL
1976-77	7.5	6.4	13.8	5.2	22.1	.6	-.4	10.1	.8	1976-77
1977-78	5.2	6.0	5.6	4.0	7.2	1.3	3.8	5.4	4.4	1977-78
1978-79	3.7	5.2	.7	4.5	10.9	1.1	.3	4.7	3.3	1978-79
1979-80	4.1	4.4	5.9	6.2	-.3	2.6	.9	-1.9	5.9	1979-80
1980-81	3.7	5.8	3.8	-1.3	10.3	.2	.6	-1.8	8.6	1980-81
1966-81	133.0	164.8	127.9	159.8	105.3	40.2	69.4	180.0	85.3	1966-81
1976-81	26.5	30.9	33.0	20.0	59.5	5.9	5.2	16.9	25.0	1976-81

Table 6

CHANGE IN EXPENDITURES FOR PERSONAL HEALTH CARE IN MICHIGAN
(in millions of dollars)

INTERVAL	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	INTERVAL
1976-77	790	332	248	56	26	38	7	73	9	1976-77
1977-78	846	410	197	65	18	55	17	68	17	1977-78
1978-79	930	483	156	83	27	67	14	81	19	1978-79
1979-80	1143	545	287	113	15	90	18	48	28	1979-80
1980-81	1275	696	266	65	36	81	19	54	38	1980-81

Table 7

INDEX OF EXPENDITURES FOR PERSONAL HEALTH CARE IN MICHIGAN
(1966 equals 100)

YEAR	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	YEAR
1966	100	100	100	100	100	100	100	100	100	1966
...										...
1969	140	142	138	146	119	132	131	171	125	1969
...										...
1972	197	200	187	208	144	174	190	289	165	1972
...										...
1976	318	349	295	373	222	229	278	413	256	1976
1977	361	393	356	416	287	243	293	481	273	1977
1978	408	447	404	465	330	264	326	544	306	1978
1979	460	511	441	528	398	290	355	619	343	1979
1980	523	583	511	613	433	326	392	663	397	1980
1981	594	675	580	662	523	357	432	713	472	1981

Table 8

CHANGE IN EXPENDITURES FOR PERSONAL HEALTH CARE IN MICHIGAN -- ADJUSTED FOR INFLATION
(in millions of 1981 dollars)

INTERVAL	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	INTERVAL
1976-77	636	249	247	38	29	5	-1	66	2	1976-77
1977-78	471	247	115	31	12	11	8	39	9	1977-78
1978-79	351	228	15	36	19	9	1	36	7	1978-79
1979-80	404	202	128	52	-1	23	2	-15	12	1979-80
1980-81	383	279	87	-12	20	2	1	-14	19	1980-81

Table 9

INDEX OF EXPENDITURES FOR PERSONAL HEALTH CARE IN MICHIGAN -- ADJUSTED FOR INFLATION
(1966 equals 100)

YEAR	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	YEAR
1966	100	100	100	100	100	100	100	100	100	1966.
...										...
1969	124	125	122	129	106	117	116	151	110	1969.
...										...
1972	151	154	143	160	111	134	146	222	127	1972.
...										...
1976	184	202	171	217	129	132	161	239	148	1976.
1977	198	215	195	228	157	133	160	264	149	1977.
1978	208	228	206	237	168	135	166	278	156	1978.
1979	216	240	207	248	187	136	167	291	161	1979.
1980	225	250	220	263	186	140	168	285	171	1980.
1981	233	265	228	260	205	140	169	280	185	1981.

Table 10

PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN MICHIGAN
(in dollars)

YEAR	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	YEAR
1966	213	89	48	16	5	30	6	13	6	1966
...										...
1969	289	122	65	22	6	39	7	21	7	1969
...										...
1972	394	168	85	31	6	50	10	35	9	1972
...										...
1976	630	290	133	54	10	64	15	49	14	1976
1977	713	325	160	60	13	68	16	57	15	1977
1978	802	368	181	67	15	74	17	64	17	1978
1979	898	418	196	75	17	81	19	72	19	1979
1980	1020	476	227	88	19	90	21	77	22	1980
1981	1157	551	258	94	23	99	23	83	26	1981

Table 11

PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN THE U.S.
(in dollars)

YEAR	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	YEAR
1966	203	80	47	15	6	28	7	12	6	1966
...										...
1969	283	119	64	21	7	36	9	19	8	1969
...										...
1972	380	165	82	27	9	45	11	31	10	1972
...										...
1976	601	272	127	43	15	60	16	52	16	1976
1977	672	305	145	48	16	64	17	60	17	1977
1978	745	337	161	53	19	69	19	68	19	1978
1979	841	383	179	59	21	77	20	78	23	1979
1980	965	442	206	68	25	85	22	91	26	1980
1981	1112	515	239	75	28	93	25	106	31	1981

Table 12

PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN MICHIGAN -- ADJUSTED FOR INFLATION
(in 1981 dollars)

YEAR	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	YEAR
1966	542	227	123	40	12	77	15	32	15	1966.
...										...
1969	652	276	146	50	12	88	17	47	16	1969.
...										...
1972	770	329	166	60	13	97	20	68	18	1972.
...										...
1976	930	428	197	80	15	95	22	72	21	1976.
1977	995	453	223	84	18	95	22	79	21	1977.
1978	1042	478	235	87	19	96	23	83	22	1978.
1979	1074	500	235	90	21	96	23	86	23	1979.
1980	1117	521	249	96	21	99	23	85	24	1980.
1981	1157	551	258	94	23	99	23	83	26	1981.

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Table 13

PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN THE U.S. -- ADJUSTED FOR INFLATION
(in 1981 dollars)

YEAR	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	YEAR
1966	516	204	121	39	15	72	17	31	16	1966.
...										...
1969	638	268	143	48	17	81	19	43	19	1969.
...										...
1972	742	323	160	53	17	87	21	60	20	1972.
...										...
1976	888	402	187	64	22	88	23	78	24	1976.
1977	938	425	202	67	23	89	23	84	24	1977.
1978	969	438	210	69	24	90	24	89	25	1978.
1979	1006	459	214	71	25	92	25	94	27	1979.
1980	1057	484	226	74	27	93	25	99	29	1980.
1981	1112	515	239	75	28	93	25	106	31	1981.

Table 14

PERCENT CHANGE IN PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN MICHIGAN

INTERVAL	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	INTERVAL
1976-77	13.3	12.1	19.9	10.9	28.6	6.0	5.0	16.0	6.2	1976-77
1977-78	12.4	13.2	12.9	11.2	14.6	8.3	10.9	12.6	11.5	1977-78
1978-79	12.0	13.7	8.8	13.0	19.8	9.2	8.4	13.1	11.6	1978-79
1979-80	13.6	14.0	15.6	16.0	8.9	12.0	10.2	7.1	15.7	1979-80
1980-81	13.4	15.6	13.4	7.9	20.6	9.6	10.0	7.4	18.7	1980-81
1966-81	443.8	517.9	431.7	506.3	379.0	227.1	295.3	553.3	332.3	1966-81
1976-81	83.7	90.2	93.2	74.3	131.7	53.8	52.9	69.9	81.6	1976-81

Table 15

PERCENT CHANGE IN PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN THE U.S.

INTERVAL	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	INTERVAL
1976-77	11.8	12.1	14.4	10.4	10.2	6.9	6.1	14.5	6.7	1976-77
1977-78	10.9	10.6	11.2	10.6	14.3	8.4	11.8	13.9	9.6	1977-78
1978-79	12.8	13.8	11.1	11.7	12.9	10.4	10.1	14.4	19.5	1978-79
1979-80	14.8	15.3	15.1	14.5	17.8	11.0	9.6	15.8	16.4	1979-80
1980-81	15.2	16.4	15.9	11.2	13.2	9.8	10.7	16.3	18.8	1980-81
1966-81	449.1	542.8	403.6	392.1	365.4	230.3	265.5	766.1	388.6	1966-81
1976-81	85.0	89.2	88.7	73.8	89.7	55.9	58.5	101.1	93.2	1976-81

Table 16

PERCENT CHANGE IN PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN MICHIGAN -- ADJUSTED FOR INFLATION

INTERVAL	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	INTERVAL
1976-77	7.0	5.9	13.3	4.8	21.5	.1	-.8	9.6	.4	1976-77
1977-78	4.7	5.4	5.1	3.5	6.7	.8	3.3	4.9	3.8	1977-78
1978-79	3.1	4.7	.2	4.0	10.3	.6	-.2	4.1	2.7	1978-79
1979-80	3.9	4.2	5.8	6.1	-.4	2.4	.8	-2.0	5.8	1979-80
1980-81	3.6	5.7	3.7	-1.4	10.2	.1	.5	-1.9	8.5	1980-81
1966-81	113.5	142.6	108.8	138.0	88.1	28.4	55.2	156.5	69.7	1966-81
1976-81	24.4	28.7	30.8	18.0	56.9	4.1	3.5	15.0	22.9	1976-81

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Table 17

PERCENT CHANGE IN PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN THE U.S. -- ADJUSTED FOR INFLATION

INTERVAL	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	INTERVAL
1976-77	5.6	5.9	8.1	4.3	4.2	1.0	.3	8.2	.8	1976-77
1977-78	3.3	3.0	3.6	3.0	6.4	1.0	4.1	6.1	2.1	1977-78
1978-79	3.8	4.7	2.2	2.8	3.9	1.6	1.3	5.3	10.0	1978-79
1979-80	5.0	5.5	5.3	4.8	7.8	1.5	.3	5.9	6.4	1979-80
1980-81	5.3	6.3	5.9	1.6	3.4	.3	1.1	6.3	8.6	1980-81
1966-81	115.6	152.4	97.7	93.2	82.7	29.7	43.5	240.0	91.8	1966-
1976-81	25.2	28.1	27.7	17.6	28.4	5.5	7.3	36.1	30.8	1976-81

Table 18

CHANGE IN PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN MICHIGAN
(in dollars)

INTERVAL	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	INTERVAL
1976-77	83	34.98	26.49	5.89	2.83	3.85	.74	7.80	.90	1976-77
1977-78	88	43.00	20.63	6.73	1.85	5.64	1.72	7.16	1.76	1977-78
1978-79	97	50.39	15.95	8.66	2.89	6.83	1.46	8.38	1.98	1978-79
1979-80	122	58.34	30.71	12.07	1.55	9.66	1.92	5.12	2.98	1979-80
1980-81	136	74.52	30.55	6.92	3.91	8.64	2.07	5.70	4.12	1980-81

Table 19

CHANGE IN PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN THE U.S.
(in dollars)

INTERVAL	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	INTERVAL
1976-77	71	32.79	18.26	4.53	1.50	4.15	.96	7.62	1.09	1976-77
1977-78	73	32.23	16.28	5.09	2.31	5.39	1.96	8.38	1.67	1977-78
1978-79	95	46.39	17.82	6.20	2.40	7.19	1.88	9.89	3.70	1978-79
1979-80	125	58.76	27.10	8.60	3.73	8.41	1.98	12.35	3.71	1979-80
1980-81	147	72.43	32.87	7.62	3.25	8.33	2.40	14.81	4.97	1980-81

Table 20

CHANGE IN PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN MICHIGAN -- ADJUSTED FOR INFLATION
(in 1981 dollars)

INTERVAL	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	INTERVAL
1976-77	65	25.28	26.13	3.81	3.15	.14	-.18	6.92	.08	1976-77
1977-78	46	24.65	11.42	2.96	1.18	.77	.72	3.85	.82	1977-78
1978-79	33	22.27	.42	3.45	1.95	.53	-.06	3.13	.61	1978-79
1979-80	42	21.24	13.58	5.52	-.09	2.35	.18	-1.76	1.32	1979-80
1980-81	40	29.54	9.10	-1.35	2.11	.11	.11	-1.60	2.04	1980-81

Table 21

CHANGE IN PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN THE U.S. -- ADJUSTED FOR INFLATION
(in 1981 dollars)

INTERVAL	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	INTERVAL
976-77	50	23.66	15.20	2.79	.90	.93	.06	6.38	.19	1976-77
977-78	31	12.55	7.21	2.01	1.45	.85	.95	5.11	.50	1977-78
978-79	37	20.66	4.65	1.93	.95	1.43	.33	4.76	2.46	1978-79
979-80	51	25.23	11.41	3.37	1.95	1.39	.08	5.53	1.75	1979-80
980-81	56	30.67	13.41	1.22	.92	.30	.28	6.24	2.48	1980-81

Table 22

INDEX OF PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN MICHIGAN
(1966 equals 100)

YEAR	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	YEAR
1966	100	100	100	100	100	100	100	100	100	1966.
...										...
1969	136	137	134	141	116	128	127	165	121	1969.
...										...
1972	185	189	176	196	136	164	178	272	156	1972.
...										...
1976	296	325	275	348	207	213	259	384	238	1976.
1977	335	364	330	386	266	225	271	446	253	1977.
1978	377	412	372	429	305	244	301	502	282	1978.
1979	422	469	405	484	365	267	326	568	315	1979.
1980	480	534	469	562	397	299	360	608	364	1980.
1981	544	618	532	606	479	327	395	653	432	1981.

Table 23

INDEX OF PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN THE U.S.
(1966 equals 100)

YEAR	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	YEAR
1966	100	100	100	100	100	100	100	100	100	1966.
...										...
1969	140	149	134	138	123	127	126	157	129	1969.
...										...
1972	187	207	173	175	144	158	159	253	163	1972.
...										...
1976	297	340	267	283	245	212	231	431	253	1976.
1977	332	381	305	313	270	227	245	493	270	1977.
1978	368	421	340	346	309	246	274	562	296	1978.
1979	415	479	377	386	349	271	301	643	353	1979.
1980	477	552	434	442	411	301	330	745	411	1980.
1981	549	643	504	492	465	330	366	866	489	1981.

Table 24

INDEX OF PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN MICHIGAN -- ADJUSTED FOR INFLATION
(1966 equals 100)

YEAR	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	YEAR
1966	100	100	100	100	100	100	100	100	100	1966
...										...
1969	120	121	118	125	102	114	112	146	107	1969
...										...
1972	142	145	135	150	104	126	137	209	120	1972
...										...
1976	172	188	160	202	120	123	150	223	138	1976
1977	184	200	181	211	146	124	149	244	139	1977
1978	192	210	190	219	155	125	154	256	144	1978
1979	198	220	190	228	171	125	153	267	148	1979
1980	206	230	201	241	171	128	154	261	156	1980
1981	213	243	209	238	188	128	155	256	170	1981

Table 25

INDEX OF PER-CAPITA EXPENDITURES FOR PERSONAL HEALTH CARE IN THE U.S. -- ADJUSTED FOR INFLATION
(1966 equals 100)

YEAR	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	YEAR
1966	100	100	100	100	100	100	100	100	100	1966
...										...
1969	124	132	119	122	109	112	112	139	114	1969
...										...
1972	144	159	133	135	110	121	122	194	125	1972
...										...
1976	172	197	155	164	142	123	134	250	147	1976
1977	182	209	167	171	148	124	134	270	148	1977
1978	188	215	173	177	158	125	140	287	151	1978
1979	195	225	177	181	164	127	141	302	166	1979
1980	205	237	187	190	177	129	142	320	177	1980
1981	216	252	198	193	183	130	144	340	192	1981

Table 26

COMPOSITION OF PERSONAL HEALTH EXPENDITURES IN MICHIGAN
(Expenditures for each category are here expressed as a percent of total expenditures.)

YEAR	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	YEAR
1966	100	42	23	7	2	14	3	6	3	1966.
...										...
1969	100	42	22	8	2	13	3	7	3	1969.
...										...
1972	100	43	22	8	2	13	3	9	2	1972.
...										...
1976	100	46	21	9	2	10	2	8	2	1976.
1977	100	46	22	8	2	10	2	8	2	1977.
1978	100	46	23	8	2	9	2	8	2	1978.
1979	100	47	22	8	2	9	2	8	2	1979.
1980	100	47	22	9	2	9	2	8	2	1980.
1981	100	48	22	8	2	9	2	7	2	1981.

Table 27

COMPOSITION OF PERSONAL HEALTH EXPENDITURES IN THE U.S.
(Expenditures for each category are here expressed as a percent of total expenditures.)

YEAR	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	YEAR
1966	100	40	23	8	3	14	3	6	3	1966.
...										...
1969	100	42	22	7	3	13	3	7	3	1969.
...										...
1972	100	44	22	7	2	12	3	8	3	1972.
...										...
1976	100	45	21	7	2	10	3	9	3	1976.
1977	100	45	22	7	2	10	2	9	3	1977.
1978	100	45	22	7	2	9	2	9	3	1978.
1979	100	46	21	7	2	9	2	9	3	1979.
1980	100	46	21	7	3	9	2	9	3	1980.
1981	100	46	21	7	3	8	2	9	3	1981.

Table 28

COMPOSITION OF GROWTH IN PERSONAL HEALTH EXPENDITURES IN MICHIGAN
(Growth of expenditures in each category is here expressed as a percent of growth in total expenditures.)

INTERVAL	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	INTERVAL
1966-69	100	43	22	8	1	11	2	10	2	1966-69
1969-72	100	44	20	8	1	10	3	12	2	1969-72
1972-76	100	51	21	10	1	6	2	6	2	1972-76
1976-77	100	42	31	7	3	5	1	9	1	1976-77
1977-78	100	48	23	8	2	7	2	8	2	1977-78
1978-79	100	52	17	9	3	7	2	9	2	1978-79
1979-80	100	48	25	10	1	8	2	4	2	1979-80
1980-81	100	55	22	5	3	6	2	4	3	1980-81

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Table 29

COMPOSITION OF GROWTH IN PERSONAL HEALTH EXPENDITURES IN THE U.S.
(Growth of expenditures in each category is here expressed as a percent of growth in total expenditures.)

INTERVAL	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	INTERVAL
1966-69	100	48	20	7	2	10	2	8	2	1966-69
1969-72	100	47	20	6	1	9	2	11	2	1969-72
1972-76	100	48	20	7	3	7	2	10	3	1972-76
1976-77	100	46	25	6	2	6	1	11	2	1976-77
1977-78	100	44	22	7	3	8	3	11	2	1977-78
1978-79	100	48	19	7	3	8	2	10	4	1978-79
1979-80	100	47	22	7	3	7	2	10	3	1979-80
1980-81	100	49	22	5	2	6	2	10	3	1980-81

Table 30

COMPARISON OF PERSONAL INCOME AND PERSONAL HEALTH EXPENDITURES IN MICHIGAN

YEAR	STATEWIDE				PER-CAPITA				YEAR
	DOLLAR AMOUNTS (in billions)		INDEX (1966= 100)		DOLLAR AMOUNTS		INDEX (1966= 100)		
	Personal Income	Health Expenditures	Personal Income	Health Expenditures	Personal Income	Health Expenditures	Personal Income	Health Expenditures	
1966	27.844	1.807	100	100	3279	213	100	100	1966
...									...
1969	34.862	2.534	125	140	3977	289	121	136	1969
...									...
1972	43.282	3.555	155	197	4796	394	146	185	1972
...									...
1976	61.324	5.740	220	318	6726	630	205	296	1976
1977	69.290	6.530	249	361	7567	713	231	335	1977
1978	77.776	7.376	279	408	8452	802	258	377	1978
1979	85.981	8.306	309	460	9296	898	284	422	1979
1980	91.650	9.449	329	523	9897	1020	302	480	1980
1981	99.314	10.724	357	594	10713	1157	327	544	1981
	INCREASE (in billions)		PERCENT CHANGE		INCREASE (in dollars)		PERCENT CHANGE		
	Personal Income	Health Expenditures	Personal Income	Health Expenditures	Personal Income	Health Expenditures	Personal Income	Health Expenditures	
1976-77	7.966	.790	13.0	13.8	841	83	12.5	13.3	1976-77
1977-78	8.486	.846	12.2	13.0	885	88	11.7	12.4	1977-78
1978-79	8.205	.930	10.5	12.6	844	97	10.0	12.0	1978-79
1979-80	5.669	1.143	6.6	13.8	601	122	6.5	13.6	1979-80
1980-81	7.664	1.275	8.4	13.5	816	136	8.2	13.4	1980-81

Table 31

COMPARISON OF PERSONAL INCOME AND PERSONAL HEALTH EXPENDITURES IN MICHIGAN -- ADJUSTED FOR INFLATION

YEAR	STATEWIDE				PER-CAPITA				YEAR
	DOLLAR AMOUNTS (in billions)		INDEX (1966= 100)		DOLLAR AMOUNTS		INDEX (1966= 100)		
	Personal Income	Health Expenditures	Personal Income	Health Expenditures	Personal Income	Health Expenditures	Personal Income	Health Expenditures	
1966	70.919	4.602	100	100	8351	542	100	100	1966
...									...
1969	78.596	5.714	111	124	8967	652	107	120	1969
...									...
1972	84.621	6.951	119	151	9376	770	112	142	1972
...									...
1976	90.596	8.480	128	184	9937	930	119	172	1976
1977	96.729	9.116	136	198	10563	995	126	184	1977
1978	101.090	9.587	143	208	10986	1042	132	192	1978
1979	102.865	9.938	145	216	11122	1074	133	198	1979
1980	100.305	10.342	141	225	10832	1117	130	206	1980
1981	99.314	10.724	140	233	10713	1157	128	213	1981
	INCREASE (in billions)		PERCENT CHANGE		INCREASE (in dollars)		PERCENT CHANGE		
	Personal Income	Health Expenditures	Personal Income	Health Expenditures	Personal Income	Health Expenditures	Personal Income	Health Expenditures	
1976-77	6.133	.636	6.8	7.5	626	65	6.3	7.0	1976-77
1977-78	4.361	.471	4.5	5.2	422	46	4.0	4.7	1977-78
1978-79	1.774	.351	1.8	3.7	136	33	1.2	3.1	1978-79
1979-80	-2.560	.404	-2.5	4.1	-290	42	-2.6	3.9	1979-80
1980-81	-.991	.383	-1.0	3.7	-119	40	-1.1	3.6	1980-81

Table 32

PERSONAL HEALTH EXPENDITURES AS A PERCENTAGE OF PERSONAL INCOME -- MICHIGAN

YEAR	TOTAL	Hospital Care	Physician Services	Dental Services	Other Professional Services	Drugs and Medical Sundries	Eyeglasses and Appliances	Nursing Home Care	Other Health Services	YEAR
1966	6.5	2.7	1.5	.5	.1	.9	.2	.4	.2	1966
...										
1969	7.3	3.1	1.6	.6	.1	1.0	.2	.5	.2	1969
...										
1972	8.2	3.5	1.8	.6	.1	1.0	.2	.7	.2	1972
...										
1976	9.4	4.3	2.0	.8	.1	1.0	.2	.7	.2	1976
1977	9.4	4.3	2.1	.8	.2	.9	.2	.7	.2	1977
1978	9.5	4.3	2.1	.8	.2	.9	.2	.8	.2	1978
1979	9.7	4.5	2.1	.8	.2	.9	.2	.8	.2	1979
1980	10.3	4.8	2.3	.9	.2	.9	.2	.8	.2	1980
1981	10.8	5.1	2.4	.9	.2	.9	.2	.8	.2	1981

Appendix A

METHODOLOGY FOR ESTIMATING PERSONAL HEALTH EXPENDITURES

Michigan estimates for years 1966 through 1978 were developed by the Health Care Financing Administration. (See HCFA, Health Care Financing Review, Vol. 4, No. 2, December 1982, pp. 1-45). Michigan estimates for 1979 through 1981 were developed by the Office of Health and Medical Affairs. U.S. estimates were obtained from HCFA's national health expenditure series published annually in the Health Care Financing Review.

An analysis of federal income tax returns generally served as the basis for HCFA's estimates regarding Michigan's physician services, dental services, other professional services, drugs, medical sundries, eyeglasses, and orthopedic appliances. HCFA generally estimated hospital expenditures on the basis of an analysis of expenses reported by individual hospitals and of each state's difference between hospital revenue and hospital expenses. A more detailed account of HCFA's methodology is contained in Appendix B.

Two general approaches were used to develop estimates for the years not included in the HCFA report. For some services, the estimates were made by applying Michigan's estimated rate of growth for each type of care to Michigan's expenditures in 1978. For other services, the estimates were based on HCFA's estimates of national health expenditures for 1979, 1980, and 1981. The national figures were adjusted to pertain to Michigan on the basis of a comparison between Michigan per-capita expenditures and U.S. per-capita expenditures for each type of care from 1966 to 1978. Further details regarding the specific methodology employed to estimate each category of expenditure are provided below.

Hospital Services

Michigan hospital expenditure estimates for years prior to 1979 were taken from HCFA's report on state health expenditures. Estimates for 1979 through 1981 were calculated by using the 1978 figure as a base and assuming that Michigan's total expenditures for hospital care increased at the same rate as the total revenue of Michigan's community hospitals (AHA, Hospital Statistics, 1976 through 1982 Editions, Table II). Community hospitals represent approximately 90 percent of Michigan's total hospital expenditures. The "total revenue" statistic was chosen because it corresponds with HCFA's definition of hospital expenditures.*

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*Confusion often arises in the use of the words "expenditure" and "revenue." From the perspective of people who pay for medical care, e.g., insurance companies, businesses, and the general public, money paid to hospitals is an "expenditure." However, from the perspective of a hospital, that same money is "revenue." Thus, the "revenue" data reported by the American Hospital Association is a measure of the "expenditure" which the people of Michigan make on hospital care.

Appendix A
Methodology for Estimating Michigan Personal Health Expenditures

Since HCFA's estimate of Michigan's total hospital expenditures grew at a slightly higher rate from 1976 to 1978 than the revenues of Michigan's community hospitals, this methodology may result in a slight underestimate of hospital expenditures from 1979 through 1981.

It should also be noted that the hospital expenditure figures in this report are based on the state in which a hospital is located rather than on each patient's state of residence. Since Michigan residents receive slightly more hospital care outside of Michigan than out-of-state residents receive in Michigan, the figures understate the hospital expenditures on behalf of Michigan residents by approximately 1.3 percent. (See HCFA, Health Care Financing Review, December 1982, pp. 9-11).

Physician Services

For years prior to 1979, estimates of Michigan physician expenditures were taken from HCFA's report on state health expenditures. Estimates for subsequent years were made by adjusting the 1978 figure to reflect the rate of change in per-enrollee physician expenditures for Michigan residents by Blue Cross and Blue Shield of Michigan, the Medicare program, and the Medicaid program.

To maintain consistency with HCFA's definition of "physician services," BCBSM payments to private laboratories were included in the category along with payments to MDs and DOs. This composite figure grew at an accelerating rate throughout this period. Although per-member payments to private labs dropped in 1979 and 1980 as a result of tighter fee screens, per-member payments to MDs and DOs grew at a higher rate each year.

The rate of change in per-member expenditures by the Medicare program in Michigan has been higher than the rate of change for BCBSM and higher than the rate of change for Medicare enrollees in other states. The rate was estimated on the basis of the expenditures on Michigan residents by the Supplemental Medical Insurance ("Plan B") program. Because Plan B covers some nonphysician services, the figures were adjusted to reflect the fact that physician services are generally declining nationwide as a proportion of Plan B expenditures. The adjustment factor was derived from HCFA's annual Health Expenditure Series.

The estimated rate of increase in payments per eligible has been lower for the Medicaid program than for the other third-party payers. The estimates were based on actual expenditures for MDs and DOs, laboratory and radiological services, clinic services, and some family planning services. Expenditures were grouped by calendar year based on the date that payment was made. These figures were divided by the number of "person years of eligibility" for Medicaid services to obtain a measure of expenditure increase which is not unduly affected by changes on the Medicaid caseload.

The overall rate of increase for each year was estimated by taking a weighted average of the rates of increase of the three third-party payers. Each figure was weighted by the number of individuals covered by the corresponding payer. It should be noted that the three payers account for somewhat more than half of all physician expenditures. It is likely that the remainder of the total--including payments by commercial insurance companies and by uninsured persons as well as by insured persons whose coverage does not pay for the entire amount charged by their physician--is growing at a higher rate because of weak controls on fees and utilization. Thus, the methodology probably underestimates the actual rate of increase in Michigan physician expenditures.

Dental Services

Michigan estimates for years prior to 1979 were taken from HCFA's report on state health expenditures. Michigan estimates for subsequent years were made by adjusting the 1978 figure for changes in the average number of hours which dentists spend with patients, changes in the number of dentists, and changes in the price of dental services.

Changes in the average number of hours which dentists spend with patients were estimated on the basis of the survey of all licensed dentists conducted by the Michigan Cooperative Health Information System. This survey indicates that the number of hours worked by the average dentist has changed very little; dentists provided an average of 35.1 hours of patient care services per week in 1977, 34.9 hours in 1978, and 35.4 hours in 1980. An estimate for 1979 was obtained by interpolation; an estimate for 1981 was obtained by taking an average of the figures for 1977, 1978, and 1980.

Estimates of the supply of dentists in 1978 and 1980 were based on the surveys conducted by Michigan Cooperative Health Information System. The estimate for 1979 was obtained by linear interpolation; the estimate for 1981 was taken from the "low series" of projections developed by the Office of Health and Medical Affairs for the Michigan State Health Plan, 1983-1987 (Vol. III, Chapter 4, forthcoming). The annual rate of change in the supply of dentists ranges from 3.1 percent for 1978-79 to 2.1 percent for 1980-81.

Changes in the price of dental services account for most of the growth and variation in dental expenditures. These changes were estimated on the basis of a price index of 45 dental procedures developed by Delta Dental of Michigan. These procedures cover more than 85 percent of dental services and costs, and they are weighted by frequency for purposes of constructing the index. The index is based on the fees filed by over 4500 dentists, representing about 85 percent of all licensed dentists in Michigan. The index rose by 9.2 percent from 1978 to 1979 and by 11.8 percent from 1979 to 1980. It rose by only 6.7 percent from 1980 to 1981, and 4.8 percent from 1981 to 1982.

Expenditures for each year from 1979 through 1981 were estimated by the following formula:

Appendix A
Methodology for Estimating Michigan Personal Health Expenditures

$$\text{expenditures}_{(t)} = \text{expenditures}_{(t-1)} \times \frac{\text{average \# of hours}_{(t)}}{\text{average \# of hours}_{(t-1)}} \times \frac{\text{\# of dentists}_{(t)}}{\text{\# of dentists}_{(t-1)}} \times \frac{\text{price index}_{(t)}}{\text{price index}_{(t-1)}}$$

The most important factor omitted from the analysis is change in productivity. On the one hand, technological improvements and increased utilization of dental assistants tend to increase the number of procedures performed for each hour of a dentist's work day. On the other hand, slackened demand during the recession, coupled with increases in the number of dentists, may tend to decrease the number of patients seen per hour.

Other Professional Services

As defined by HCFA, "other professional services" includes the services of chiropractors, psychologists, private duty nurses, podiatrists, other independently reimbursed therapists, and home health agencies that are not included under "hospital services." For years prior to 1979, estimates of Michigan's expenditures for this category of service were taken from HCFA's report on state health expenditures. Michigan estimates for subsequent years were made by the same methodology which was used to estimate physician expenditures: per-enrollee spending by the major third party payers was used to estimate Michigan's rate of change from year to year, which in turn was used in conjunction with the 1978 HCFA figure to produce estimates for each year.

The rate of change for Blue Cross and Blue Shield of Michigan was based on BCBSM payments to chiropractors and podiatrists. For the Medicaid program, the estimate was based on payments to home health providers and all other non-medical and non-dental professionals who provide covered services. For the Medicare program, the estimate was based on expenditures for Michigan residents by the Supplemental Medical Insurance ("Plan B") program, adjusted for the nationwide trend for "other professional services" to comprise a rising portion of the program's total expenditures. The overall rate of growth was estimated as a weighted average of the growth rates of the three third party payers. It should be noted, however, that these payers made only about one third of the total payments for this category of health service. Thus, this is an imperfect estimate of the overall rate of change.

Expenditures by the various payers are quite sensitive to changes in the payer's reimbursement policies with the result that the rate of growth varies significantly from year to year and from payer to payer. BCBSM experienced growth of more than 20 percent from 1978 to 1979 and from 1980 to 1981, but the rate was much lower from 1979 to 1980. The Medicaid program experienced a fairly low rate of growth throughout the period, while the Medicare program experienced a high rate of growth until the 1980-81 period.

Drugs and Medical Sundries

Michigan estimates for years prior to 1979 were taken from HCFA's report on state health expenditures. Subsequent estimates were calculated under the assumption that Michigan's relative per-capita drug expenditures declined from 106.4 percent of the national average in 1978 to 106.1 percent of the national average in 1981. This assumption is based on data from HCFA's state health expenditure report, which shows that Michigan's drug expenditures have fluctuated somewhat in the past relative to U.S. expenditures: the state's per-capita expenditures rose from 108 percent of the national average in 1966 to 111 percent of the national average in 1972; they then dropped from 107.5 percent of the national average in 1976 to 106.5 percent in 1977 and 106.4 percent in 1978. (Data on national drug expenditures are taken from HCFA's national health expenditure series, reported annually in the Health Care Financing Review.)

Eyeglasses and Appliances

Michigan estimates for years prior to 1979 are taken from HCFA's report on state health expenditures. Estimates for subsequent years were calculated under the assumption that Michigan's relative per-capita expenditures for eyeglasses and appliances fell from 93.6 percent of the national average in 1978 to 92 percent of the national average in 1981. This assumption is based on the fact that Michigan's expenditures in this category have fluctuated somewhat in the past relative to U.S. expenditures: the state's per-capita expenditures rose from 85.7 percent of the national average in 1966 to 95.5 percent in 1972. They then dropped from 95.3 percent of the national average in 1976 to 94.3 percent in 1977 and 93.6 percent in 1978. (Data on national expenditures for eyeglasses and appliances are taken from HCFA's national health expenditure series, reported annually in the Health Care Financing Review.)

Nursing Home Care

Estimates of Michigan nursing home expenditures for years prior to 1979 were taken from HCFA's report on state health expenditures. Estimates for subsequent years were made by adjusting the 1978 figure to reflect the estimated growth in the number of patient days and in the payment per day, i.e.,

$$\text{expenditures}_{(t)} = \text{expenditures}_{(t-1)} \times \frac{\text{patient days}_{(t)}}{\text{patient days}_{(t-1)}} \times \frac{\text{payment per day}_{(t)}}{\text{payment per day}_{(t-1)}}$$

Data on the number of patient days for 1978, 1979, and 1980 were taken from the annual survey of nursing homes conducted by the Michigan Cooperative Health Information System of the Michigan Department of Public Health. The number of patient days rose by about 1 percent from

1978 to 1979, and then dropped by about one quarter of one percent from 1979 to 1980. Because the necessary survey data for 1981 had not been processed in time for inclusion in this publication, the number of patient days was estimated to be the same in 1981 as in 1980. The rate of change in the payment per day was estimated from Medicaid program data obtained from the Michigan Department of Social Services. Payments to nursing homes by the Medicaid program were combined with the payments on behalf of Medicaid patients from other sources and divided by the days of care received by Medicaid patients. This measure of the payment per day rose by 12.8 percent from FY 1978 to FY 1979, and by an annual average rate of 7.5 percent from FY 1979 to FY 1982. Growth rates for individual years after 1979 cannot be calculated because comparable patient day statistics are not available. This measure is thought to be a reasonable indicator of the overall trend, since Medicaid patients account for approximately 70 percent of all nursing home expenditures. However, since payments for non-Medicaid patients may be rising at a different rate and since Medicaid payments may not have risen at a uniform rate between 1979 and 1982, the annual estimates of nursing home expenditures are subject to greater potential error than the other estimates in this report.

Other Health Services

Michigan estimates for years prior to 1979 are taken from HCFA's report on state health expenditures. Estimates for subsequent years are calculated under the assumption that Michigan's per-capita expenditures for "other health services" have been 89 percent as great as the U.S. average. This assumption is based on the fact that Michigan's per-capita expenditures in this category have fluctuated very little in recent years, remaining between 88 percent and 90 percent of the U.S. average since 1972; 89 percent represents an average of the last four years for which data are available. (Data on national expenditures for this category are taken from HCFA's national health expenditure series, reported annually in the Health Care Financing Review.)

Appendix B

Definition and Methodology Used by Health Care Financing Administration to Estimate State Personal Health Expenditures

Definitions and Methodology

In the following descriptions of the methods used to estimate personal health expenditures by state, distributors or allocators for a service are developed and then adjusted to equal the NHE service totals. The reliability of this method of estimating is predicated on the assumption that the national health expenditure estimates provide a more accurate level of spending than does the summation of any available state data used to produce state estimates. Available state allocators may be sample data, proxies for expenditures or conceptually different.[7]

The sum of the state estimates differ in some cases from the NHE service totals. The difference measures: services provided in U.S. Territories or possessions as in the case of hospital expenditures and other health services; services rendered by U.S. taxpayers while living abroad, as in the case of physician, dental and other professional expenditures; and services furnished to U.S. military and civilian personnel living abroad or stationed on military vessels, as in the case of other health services.

State personal health care expenditures presented here incorporate 1966 and 1969 estimates previously published in *Personal Health Care Expenditures By State*, Vol. II (Cooper, et al.) Since that time, concepts and definitions of some NHE types of service have been revised and a few additional data sources have become available. Both of these changes have led to the introduction of different methodologies. Further changes in the earlier estimates result from the preparation of these series on a calendar, rather than fiscal year, basis.

Expenditures for Hospital Care

Expenditures for hospital care include spending for all services billed through hospitals: room and board, drugs and other medical durables, hospital outpatient and emergency room services, services provided by hospital personnel (including salaried physicians) and hospital-based home health services. The fees of self-employed physicians treating patients in a hospital setting are usually billed through the physicians' offices and are included as part of expenditures for physician services.

Hospital care as measured by the National Health Expenditure series is based on the total net revenues of community hospitals and the expenses of all non-community hospitals. The revenue concept has been adopted for community hospitals because it reflects the actual income with which a hospital must operate. The revenue data includes income from sources such as endowment funds, government grants and contributions while excluding the costs of such items as charity cases and bad debts. Expense data is assumed to be equivalent to revenues in non-community hospitals.

Over 85 percent of the 1966 and 1969 hospital estimates by state are based on hospital expense data compiled by the American Hospital Association (AHA, 1967, 1970). Another 12 percent—those estimates representing Federal hospital expenditures—are distributed to States using unpublished Federal agency data. These estimates cover the costs of operating Veterans Administration hospitals, Defense Department hospitals, Indian Health Service hospitals and Public Health Service hospitals. The remaining three percent of the 1966 and 1969 hospital expenditures represent expenditures for services in osteopathic hospitals. A proxy for expense data by state for these hospitals was developed using expenses per patient day in community hospitals (AHA, 1967, 1970) multiplied by data on the days of care in osteopathic hospitals as supplied by the American Osteopathic Hospital Association.

Data compiled by the American Hospital Association (AHA, 1971-73, 1975-79) includes expenses for each hospital in the U.S. and comprises the major data source for state estimates of hospital expenditures since 1969. In order to correspond in concept to the national methodology, each community hospital's expenses were adjusted to reflect revenues by applying a state-wide revenue to expense ratio (AHA, 1973, 1977-80, c).[8] To compensate for different reporting periods, individual hospital's revenue or expense[9] estimates were linked with adjoining years' estimates. These estimates were adjusted to a calendar year based upon the proportion of the reported financial year falling within a given calendar year.

The AHA data has several limitations. AHA solicits data by mail questionnaires from hospitals in the U.S. and U.S. associated areas. In 1978, 89.6 percent of all

[7]For example, the physician sector state estimates are based upon tabulations of *total* receipt data reported by physicians while the national estimates rely upon *business* receipts. The level of receipts differ in the two series, but the distribution among states is similar.

[8]Ratio calculated from revenues and expenses for (1) non-government nonprofit hospital and (2) for-profit and state and local government hospitals.

[9]Expenses were used for noncommunity hospitals.

registered hospitals responded. The response rate varies with the hospital size, regional location, and type of control."

In cases where responses were not received, AHA estimated missing cells. Until 1978, the estimation procedure involved grouping all hospitals by similar geographic and demographic characteristics and estimating missing data using mean values for those hospitals which did report. This procedure resulted in inconsistent expense data for individual hospitals, since the estimated expenses were not linked to actual expenses reported in prior years. Beginning in 1978, a revised procedure was used in estimating missing data cells which involved linking estimated cells to prior year's data whenever possible.

IRS Data

The major segments of spending for physician, dental and other health professional services were estimated using IRS business tax return information. This data source and its limitations will be discussed here, with the specific estimating method for each service presented separately under the service description.

The Internal Revenue Service publishes data on business receipts by business type in its *Statistics of Income* (SOI) publications. The SOI data is generated from stratified samples drawn from the universe of proprietorship, partnership and corporate returns. Among the published data are tables on business receipts for the medical sector in selected states for selected types of businesses. It is this source which forms the basis for national estimates of physician, dental and other professional health expenditures.

Over the past few years, samples extracted to produce the SOI have diminished in size, with less and less emphasis placed on stratifying the samples to yield state-reliable data. The result is an increasing proportion of suppressed information in the state tables, and less reliability in the state data which is published.

In order to create the most reliable estimates possible, HCFA contracted with IRS to prepare state-by-state tabulations of tax information for the medical sector. Using the business master file (BMF) data base, total receipts for physicians, dentists and other medical professions for 1976 and 1977 were compiled by state.

The BMF information provides a complete, reliable source for estimating medical expenditures by state. It differs from the SOI sample data used to estimate the National Health Expenditures in the following ways:

First, the National Health Expenditure estimates for physicians, dentists and other health professionals are based predominantly upon IRS *business* receipts from SOI sample. *Total* receipts from the BMF which are used to distribute spending by state include business receipts *plus* "investment income such as interest, rents, royalties, nonqualifying dividends, net gain from sale of noncapital assets, income from farms and other partnerships; and 'other' income" (IRS, 1979).

Second, industrial classification accounts for additional differences between business receipts data from the SOI used in the National Health Expenditures and the total receipts used to produce the state expenditures. In the SOI, samples are drawn and industrial classification verified. As many as one-third of the sample of corporate returns are reclassified to different categories (Powell and Stubbs), although the percentage of reclassification in the medical industry specifically, and for sole proprietors and partnership business, should be considerably lower.

The industrial classification of total receipt data, however, is not verified. For partnerships and corporations, the industry code is chosen by the filer to represent the business activity which generated the largest proportion of total receipts. For sole proprietors, a written explanation of the business activity provided by the filer is assigned an industry code by an IRS clerk as the data is encoded for computer processing.

Expenditures for Physicians' Services

Spending for physician care covers all services supplied and billed through medical physician's and osteopathic physician's offices, including medical laboratory tests requested by the physician and direct billing by independent labs. Excluded is the cost of life insurance examinations performed to qualify an individual for life insurance coverage.

Distributions of physician estimates by state for 1966 were developed using counts of physicians in private practice (AMA, 1966) and non-federal osteopaths (NCHS, 1971, a) and special, unpublished tabulations of average net incomes of physicians supplied by the Internal Revenue Service. For 1969, the average net incomes of physicians by state were extrapolated using regional increases in average net income (AMA, 1973). The result was multiplied by the number of physicians (AMA, 1968) and number of non-federal osteopaths in private practice (NCHS, 1971, a). For each year, the distributions were adjusted to equal the NHE total.

For 1966 and 1969, medical laboratory expenses are generated using a state distribution of Medicare certified independent labs (SSA, 1970). Physician group

"In 1978, the lowest response rate for registered hospitals (76-80%) came from Alaska, Mississippi, Utah and Wyoming. Hawaii, Maine, Montana, Nevada, Rhode Island, Vermont and Wisconsin had the highest response rate (96-100%). The response rate by bed size increases steadily from a low of 72.9% for hospitals with 6-24 beds to a high of 98.1 percent for hospitals with 300-399, with the response rate declining slightly for larger hospitals. By type of control, federally-operated hospitals were most likely to respond (97.1 percent) while non-government, for-profit hospitals responded least (79.4 percent). (AHA, 1979, c, pp. xiv-xv.)

practice estimates are based on enrollment data for those organizations. Receipts for life insurance examinations were allocated based on population under age 65 (Census, 1969, 1970).

For 1976 and 1977, state estimates of spending for physician care relied upon physician and osteopathic physician total receipt data tabulated by IRS (see section titled "IRS data"). Total receipts include all payments for physician services paid through physician offices (including laboratory tests). To generate estimates for 1972, the AMA number of non-federal office-based physicians involved with patient care (AMA, 1969, 1972, 1976) was used to interpolate between 1969 and 1976 estimates. Counts of non-federal office-based physicians (AMA, 1977, 1978) were used to extrapolate from 1977 to 1978.

Receipts from life insurance examinations are distributed based upon the 18-65 year old population (Census, 1980). These estimates are subtracted from estimates of expenditures for physician care.

Expenditures for Dental Services

Expenditures for dental care include spending for all services billed through dental offices, including services provided by dental laboratories. The 1966 and 1969 dental service expenditures are distributed to states based upon mean gross income of dentists (ADA, 1964, 1968, 1971) and the number of active, non-federal dentists (NCHS, 1966, 1968, 1970) in each state.

For 1976 and 1977, IRS tabulations of total receipts of dentists were adjusted to the NHE totals. Interpolation of the 1969 and 1976 dental estimates using personal income (BEA, 1981) resulted in a distribution for 1972 of dental expenditures. Estimates for 1977 were extrapolated to 1978 using personal income (BEA, 1981).

Expenditures for Other Professional Services

Other professional services include the remainder of health professionals in private practice. Among these professionals are private duty nurses, chiropractors, optometrists, dieticians, podiatrists, psychologists and physiotherapists. Excluded is that portion of optometrists receipts which account for the purchase of eyeglasses. In addition, home health services provided through nonhospital related agencies are included in other professional services, accounting for twenty percent of other professional services in 1978. In earlier years, Visiting Nurses Association fulfilled much of the home health function.

For 1966 and 1969, distribution of health professionals in private practice are based upon counts of these professionals multiplied by their average salary (or salary proxy). For private duty registered, licensed practical and public health nurses, the number of nurses times (ANA, 1966, 1967, 1969) the average salary (ANA, 1966, 1968, 1970-71) was used to allocate the national control to states. For chiropractors and other professionals, the number of professionals (NCHS, 1968, 1971, a) times the state *per capita* personal income (BEA, 1966, 1981) was used.

For 1976 and 1977, the distribution by state of health professionals in private practice is based upon IRS business receipt data. The deduction from optometrist receipts for the cost of eyeglasses is allocated to states using IRS optometrist total receipts.

The state distribution for 1972 results from the interpolation between the 1969 and 1976 estimates using population (Census, 1971, 1981, a). For 1978, the 1977 estimates of other professionals were extrapolated using population (Census, 1981, a).

For 1972 forward, home health expenditures by state were estimated in three parts: Medicare, Medicaid and other. State estimates for Medicare home health, which financed over fifty percent of home health in 1978, were derived from an unpublished forty percent sample of Medicare billing forms representing interim payments to providers. Medicaid home health allocators come from statistical reports (HCFA, 1976-79) provided by states. The remainder, less than twenty percent of home health expenditures, were based upon the distribution of over 65 population (Census, 1980).

Expenditures for Drugs and Medical Sundries; Expenditures for Eyeglasses and Orthopedic Appliances

Drug and medical sundries and eyeglasses and orthopedic appliances include expenditures for products purchased in retail stores. Specifically excluded are products furnished in hospitals, nursing homes or through other medical professionals' offices, since expenditures for these items are included in the institutions' or professionals' charges.

State distributions for drug and drug sundries were developed from merchandise sales of drugs and health aids (Census, 1967, 1972, 1977). Data for 1967, 1972 and 1977 were extrapolated and interpolated using population (Census, 1971, 1981, a) to produce allocators for 1966, 1969, 1976 and 1978. All series were adjusted to the NHE control totals.

The distribution of expenditures for eyeglasses and appliances are based upon unpublished data from the Health Resources Administration on the number of optometrists and their average receipts[11]. 1976 and 1977 average optometrist receipts were extrapolated back to 1966 and forward to 1978 using personal income (BEA, 1966, 1981). The resulting distributions were used to allocate the NHE control.

[11]Calculated using unpublished IRS tabulations of total optometrist receipts. See "IRS Data" section.

Expenditures for Nursing Home Care

Nursing home expenditures cover care rendered in skilled nursing and intermediate care facilities, including those for the mentally retarded. Excluded are the costs of long-term care provided by hospitals.

Nursing home care underwent a definitional revision since the original publication of the 1966 and 1969 state series. In 1972, legislation was enacted to expand Medicaid coverage to services rendered in intermediate facilities, including facilities for the mentally retarded (ICF/MR).[12] At that time, the definition of nursing home care was expanded to include services rendered in intermediate care facilities. Before that time, ICF services were not classified as a health expenditure.

The nursing home estimates for 1966 and 1969 are based on modal monthly charges (NCHS, 1972,b) and number of residents (NCHS,1972, 1974,c) in facilities offering nursing care, personal care with nursing care, and personal care.

For 1972, the 1969 nursing home expenditure estimates were extrapolated using the number of nursing home residents (NCHS,1972, 1974, 1976,c).[13]

Nursing home receipts (Census,1981,d) from 1977 Census of Health Services form the basis of the latest state estimates. Cells suppressed to avoid disclosure of confidential information were estimated using unpublished private wages and salaries reported for nursing homes from BEA's Employment Security (ES202) state data files. Estimates for 1976 and 1978 were developed by extrapolating the 1977 nursing home expenditures using private nursing homes' wages and salaries. For 1976 through 1978, ICF/MR expenditures are estimated as an independent segment of nursing home care, using data reported by the Medicaid State Agencies (HCFA, 1976-79).

[12]ICF/MR is the most rapidly growing segment of nursing home expenditures. Approximately 95% of the individuals covered by Medicaid ICF/MR services receive care in large, usually public facilities such as state institutions. The remainder occupy small (under 15 beds) facilities which are usually privately operated.

[13]An average of the 1971 and 1973 data was used to represent 1972 number of residents.

Expenditures for Other Health Services

Other health services include all personal health services which cannot be encompassed in any of the previously defined categories. Included are expenditures for services such as industrial inplant health services, medical services rendered to shipboard military personnel, school health services, spending for transportation to medical facilities by ambulance or other methods and multi-faceted health services rendered through federal grant programs.

From 1966 to 1978, a minimum of 25 percent of other health services spending was for inplant health services. Allocators for this series are the product of the number of occupational health nurses (ANA, 1966, 1972, 1977-78,a) and their average weekly wages (ANA, 1968, 1970-77,b; BLS, 1976-78).

The Department of Defense accounts for the second largest proportion of other health spending. It includes the cost of health care rendered to active duty military personnel stationed in areas without access to military hospitals (shipboard medical facilities, field medical stations) and other miscellaneous care. The distribution by state is based on special tabulations supplied by the Department of Defense.

Federal grant programs such as Maternal and Child Health, Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA), community health centers and community block grants fund other personal health services. Estimates of these grant programs expenditures are distributed to states based upon grant appropriations by state supplied by the funding agencies.

A state distribution of expenditures for school health comes from health services expenditures in public schools (NCES, 1971-72, 1975-78). Distribution of other personal health services provided by the Veterans Administration is estimated using data on the expenditures for services in VA hospitals and nursing homes.

Expenditures for Medicare other personal health services are distributed to states using unpublished Medicare-Supplemental Medical Insurance reimbursement data for ambulance services. Medicaid and other public assistance medical payments for personal health services are allocated to states using state-reported spending data (HCFA, 1976-79). Indian Health Service spending for other personal health services are distributed to states using unpublished tabulations of ambulatory and contract care appropriations.

Appendix C

DEMOGRAPHIC AND ECONOMIC ADJUSTMENTS

Population

Per-capita figures for 1966 through 1979 were based on the inter-censal population estimates of the U.S. Bureau of the Census. The figure for 1980 is the final census count for April 1980. The population estimate for 1981 is the official estimate prepared by the Michigan Department of Management and Budget.

Inflation

Because the dollar is always changing in value by inflation, it is useful to re-express expenditures in some unit of constant value. Economists generally use the purchasing power of the dollar in a selected year as this unit. In this report, expenditures are adjusted for inflation by expressing them in "1981 dollars." Thus, they indicate how much the health services consumed in a given year would have cost if the dollar had had the same purchasing power than it had in 1981.

Roughly speaking, changes in the inflation-adjusted figures are a measure of changes in the quantity of health services purchased in a given year. Changes in the adjusted expenditures over time also reflect the extent to which health care prices have risen more than prices for other goods and services.

The measure of inflation used to translate expenditure figures into 1981 dollars is the GNP deflator, which reflects the prices of all goods and services produced in the economy, including both consumer and non-consumer items. Price data were obtained from Economic Indicators, U.S. Council of Economic Advisors, 1980 Supplement and November 1982.

Index Numbers

Index numbers express expenditures for a given year as a percentage of expenditures in the base year. For example, if the index number for one category is 150 and the index for another is 230, this indicates that expenditures in the first category are one and a half times (150 percent) as great as they were in the base year, while expenditures in the second category are 2.3 times (230 percent) as great as they were in the base year. Index numbers are constructed by dividing expenditures for each year by expenditures in the base year, and then multiplying by 100.